

STATEMENT OF WORK FOR EXPERT ASSISTANCE

Requesting Professional: Todd S. Tisdale, Lead Engineer, Lake Okeechobee Division, Watershed Management Department

Project Name: Examining methodologies that assess land use change impacts in the Lake Okeechobee watershed

Date: March 20, 2002

Areas of Expertise Requested

Surface water hydrology, water quality (nonpoint source pollution) modeling, agricultural BMPs for nutrient management

Introduction/Background

In the year 2000, the Florida State legislature made the following declarations while enacting the Lake Okeechobee Protection Program (373.4595, Florida Statutes):

- (1) “ . . . Lake Okeechobee is one of the most important water resources of the state, providing many functions benefiting the public interest, including agricultural, public, and environmental water supply; flood control; fishing; navigation and recreation; and habitat to endangered and threatened species and other flora and fauna.”
- (2) “ . . . it is imperative for the state, local governments, and agricultural and environmental communities to commit to restoring and protecting Lake Okeechobee . . . ”
- (3) “ . . . phosphorus loads from the Lake Okeechobee watershed have contributed to excessive phosphorus levels in Lake Okeechobee and downstream receiving waters . . . and that a reduction in levels of phosphorus will benefit the ecology of these systems.”
- (4) “It is the intent of the Legislature to achieve and maintain compliance with water quality standards in Lake Okeechobee . . . through a . . . protection program to reduce . . . phosphorus loads to Lake Okeechobee . . . This program shall be watershed-based, shall provide for consideration of all potential phosphorus sources, and shall include . . . refinement of existing regulations . . . ”

Boundaries for the Lake Okeechobee watershed, as defined by the Lake Okeechobee Protection Program, are given in SFWMD (1997).

As a consequence, the Lake Okeechobee Protection Program requires of the South Florida Water Management District (District): “Prior to authorizing a discharge into works of the district, the district shall require responsible parties to demonstrate that

proposed changes in land use will not result in increased phosphorus loading over that of existing land uses.”

In support of this requirement, the District proposes to identify an existing methodology that can determine if a requested land use change in the Lake Okeechobee watershed will (or will not) increase the phosphorus load relative to an existing land use. This methodology will be applicable to land parcels of several thousand acres or less, provide reliable results; and not require an extensive data collection effort (e.g. observing stream discharges or collecting and analyzing water samples for phosphorus concentrations). Furthermore, the methodology should be straightforward and easy to use, and methodology results generated by one party should be reproducible by a second, when provided with correct input data.

The goal of this expert assistance project is to identify the best methodology available for assessing land use change impacts on phosphorus loading. Although the District will provide the expert with candidate methodologies, the expert may also examine additional methodologies as deemed appropriate. In selecting a methodology, the expert should assume that the selected methodology will be used by an engineer/scientist acting as a consultant for any party who may wish to demonstrate that a proposed land use change will not increase phosphorus loads leaving a land parcel. Further, the consultant will submit all work to the District for review by regulatory staff.

Scope of Work – Duties and Tasks of the Expert

To meet the goal of this project, the expert will review candidate methodologies in two phases. First, all methodologies selected for review will be screened at a low level of detail, to determine which are most suitable for assessing land use change impacts on phosphorus loads. The top two to four methodologies from this screening will be examined in greater detail, to select the one most suitable for the Lake Okeechobee Protection Program.

Prior to methodology examination, the expert will develop a set of categories and a scoring system for assessing methodology performance at both the screening level and high level of detail. Possible categories for either evaluation may include: (1) availability of methodology to potential users; (2) data availability; (3) ease of application; (4) soundness of underlying theory; (5) reliability; and (6) ease with which District staff can review methodology application. Based on District input, the expert then will identify methodologies for review. Once a list of methodologies is assembled, the expert will conduct the preliminary screening. After District staff review this screening, the expert will conduct the final, high level-of-detail examination. Following comment by District staff on the detailed examination, the expert will recommend one methodology for adoption by the District, and develop a plan for the implementation and use of that methodology.

Description of Expert Assistance by Task

Task 1. Receive and review District materials

Relevant project materials will be provided to the expert. The expert will acknowledge receiving these materials to the District project manager by email (ttisdale@sfwmd.gov), within one day of their receipt. Materials include:

- (1) general description of phosphorus problem in the Lake Okeechobee watershed (Haan, 1995);
- (2) documentation for the CREAMS-WT field-scale nonpoint source pollution model (Heatwole 1986, Heatwole et al. 1987);
- (3) documentation for the FHANTM field-scale nonpoint source pollution model (Tremwel 1992, Tremwel and Campbell 1992);
- (4) documentation for the FHANTM-2 field-scale nonpoint source pollution model (Fraisie and Campbell 1996, Fraisie and Campbell 1997);
- (5) documentation for the EAAMOD-OKEE field-scale nonpoint source pollution model (Soil and Water Engineering Technology, Inc. 1996, Botcher et al. 1998);
- (6) comparisons of CREAMS-WT, FHANTM, FHANTM-2, and EAAMOD-OKEE (Haan, 1993, Zhang et al. 1995, Zhang and Gornak 1999);
- (7) Documentation for the Florida Phosphorus Index (USDA State Technical Committee 2000)

The expert will review these materials and submit any relevant questions to the District project manager by email, within five days of receiving the materials. If the expert has no questions, he will state in his email to the District project manager that he has completed the review of District materials and has no questions at this time. The District project manager will respond to any questions by email, within two days of receiving them. If the expert submits his questions as an attachment to the email, the questions should be written using MS Word. Although the expert may have no questions pertaining to District materials upon completion of his initial review, he is free to ask any relevant questions, as they arise, throughout the project's duration.

Deliverables: (1) Acknowledge receipt of materials by email. (2) Acknowledge that review of materials is complete and submit any relevant questions.

Due Dates: Deliverable (1) is due within one day of receiving of project materials. Deliverable (2) is due within five days of receiving project materials.

Task 2. Develop scoring categories and scoring systems

The expert will recommend: (1) a set of categories and scoring system for the preliminary screening of candidate methodologies and (2) a set of categories and scoring system for the detailed examination of candidate methodologies. Proposed categories and scoring systems will be sent to the District project manager in a memorandum via email. The memorandum will be written using MS Word and due fourteen days (two weeks) after

execution of the purchase order. A brief rationale for the selection of each category and scoring system will be included in the memorandum. Upon review by District staff, the District project manager (or designee) and the expert will discuss the report's recommendations, and arrive at a mutually acceptable set of categories and scoring system for each review. The District project manager (or designee) will contact the expert on the telephone, and the discussion will take place no later than two days after receipt of the expert's report. The District project manager (or designee) will provide the expert, through email, with a brief summary of important decisions made during the telephone discussion, within one day of the discussion. If needed, the expert will email a short follow-up memorandum to the District project manager, within two days of the telephone discussion. This memorandum will identify the final set of categories and scoring system for the two methodology reviews.

Deliverables: (1) Memorandum presenting proposed categories and scoring systems for preliminary screening and detailed examination. (2) Follow-up memorandum presenting final categories and scoring systems for detailed screening and detailed examination, if needed.

Due Dates: Deliverable (1) is due fourteen days (two weeks) after execution of purchase order. If needed, deliverable (2) is due within two days of telephone discussion.

Task 3. Identify methodologies for review

The expert will propose a set of methodologies to review. These methodologies should include, but are not limited to, the following: (1) the CREAMS-WT field scale nonpoint source pollution model; (2) the FHANTM field-scale nonpoint source pollution model; (3) the FHANTM-2 field-scale nonpoint source pollution model; (4) the EAAMOD-OKEE field-scale nonpoint source pollution model; and (5) the Florida Phosphorus Index. Documentation for these methodologies will be forwarded to the expert under Task 1 of this project. Recommended methodologies will be submitted to the District project manager in a short memorandum through email. The memorandum will be written using MS Word and due 28 days (four weeks) after execution of the purchase order. Reasons for recommending methodologies in addition to those listed above will be included in the memorandum. Also included will be documentation for the additional methodologies. This documentation can be in either hard copy (sent separately from the memorandum) or electronic (accompanying the memorandum) form. If in electronic form, the District project manager must be able to easily convert the documentation to hard-copy form. If additional methodologies are not recommended, the expert should briefly explain why. The District project manager (or designee) will contact the expert on the telephone within two days of receiving the memorandum to resolve any concerns expressed by District staff over methodologies listed in the memorandum, or tell the expert that District staff concur with all recommendations. The District project manager (or designee) will provide the expert, through email, with a brief summary of important decisions made during the telephone discussion, within one day of the discussion. If any

changes are made to the list as a result of the telephone call, the expert will submit a revised memorandum via email within two days of the telephone conversation.

Deliverables: (1) Memorandum presenting list of methodologies to be reviewed. (2) Memorandum presenting revised list of methodologies to be reviewed, if needed.

Due Dates: Deliverable (1) is due 28 days (four weeks) after execution of purchase order. If needed, deliverable (2) is due within two days of telephone discussion.

Task 4. Preliminary screening of methodologies

The expert will conduct the preliminary screening of candidate methodologies identified under Task 3, using the categories and scoring system developed under Task 2. The screening will select between two and four methodologies for the detailed examination in Task 5. Upon completion, the expert will submit the screening results in a memorandum, written using MS Word, to the District project manager through email. The memorandum is due 56 days (eight weeks) after execution of the purchase order. The memorandum will provide reasons for (1) scores awarded in each category for all methodologies and (2) the acceptance or rejection of a methodology to the detailed examination. The District project manager (or designee) will contact the expert on the telephone within two days of receiving the memorandum to resolve any concerns expressed by District staff about the screening, or tell the expert that District staff concur with the screening results. The District project manager (or designee) will provide the expert, through email, with a brief summary of important decisions made during the telephone discussion, within one day of the discussion. If concerns need to be resolved, the expert will submit a revised memorandum via email within four days of the telephone conversation.

Deliverables: (1) Memorandum presenting results of preliminary screening. (2) Memorandum presenting revised results of preliminary screening, if needed.

Due Dates: Deliverable (1) is due 56 days (eight weeks) after execution of purchase order. If needed, deliverable (2) is due within four days of the telephone discussion.

Task 5. Detailed examination of methodologies

The expert will conduct the detailed examination of methodologies selected from Task 4, using the categories and scoring system developed under Task 2. This examination will select the methodology best suited to assessing the effects of land use changes on phosphorus loads leaving a land use parcel in the Lake Okeechobee watershed. Upon completion, the expert will submit examination results in a memorandum, written using MS Word, to the District project manager through email. The memorandum is due 98 days (14 weeks) after execution of the purchase order. The memorandum will provide

reasons for (1) scores awarded in each category for all methodologies and (2) the acceptance or rejection of each methodology. The District project manager (or designee) will contact the expert on the telephone within two days of receiving the memorandum to resolve any concerns expressed by District staff about the final selection, or tell the expert that District staff concur with examination results. The District project manager (or designee) will provide the expert, through email, with a brief summary of important decisions made during the telephone discussion, within one day of the discussion. If concerns need to be resolved, the expert will submit a revised memorandum via email within four days of the telephone conversation on the mutually agreeable methodology prioritization.

Deliverable: (1) Memorandum presenting results of detailed examination. (2) Memorandum presenting revised results of detailed examination, if needed.

Due Dates: Deliverable (1) is due 98 days (14 weeks) after execution of purchase order. If needed, deliverable (2) is due within four days of the telephone discussion.

Task 6. Develop plan for methodology implementation and use

The expert will develop a plan for implementing and using the methodology selected in Task 5. Implementation planning includes tasks required of the District to get the methodology in a usable state (e.g. methodology testing, developing data sets, approvals by state or federal agencies). Use planning includes identifying responsibilities of the District and parties applying for land use changes. The plan will be submitted in a memorandum, written using MS Word, to the District project manager through email. The plan is due 105 days (15 weeks) after execution of the purchase order. The District project manager (or designee) will contact the expert on the telephone within two days of receiving the memorandum to resolve any concerns expressed by District staff about the plan, or tell the expert that District staff concur with the plan. The District project manager (or designee) will provide the expert, through email, with a brief summary of important decisions made during the telephone discussion, within one day of the discussion. If concerns need to be resolved, the expert will submit a revised plan via email within four days of the telephone conversation.

Deliverables: (1) Memorandum presenting a plan for implementation and use of the methodology. (2) Memorandum presenting the revised plan, if needed.

Due Dates: Deliverable (1) is due 105 days (15 weeks) after execution of purchase order. If needed, deliverable (2) is due within four days of the telephone discussion.

Responsibilities of Requesting Division

The District project manager, Todd Tisdale, will deliver supporting materials to the expert. Mr. Tisdale, or a designee, also will be available to answer questions the expert may have, and will schedule and make all telephone calls specified in the task descriptions.

Evaluation Criteria for Acceptance of Deliverables

Task 1 – The expert acknowledges through email that all supporting materials were received within one day of delivery. The expert acknowledges through email that all material have been reviewed and submits any relevant questions, based on that review, within five days of delivery.

Task 2 – Rationale for selecting each scoring criterion must be clearly stated by the expert in his memorandum. Application of the scoring system to each criterion should be straightforward, intuitive, and subject to as little interpretation as possible. Scoring criteria should reflect previously stated District needs for an evaluation methodology (e.g. ease of use, replication of results).

Task 3 – Reasons for the inclusion of additional methodologies in the review should be clearly stated, comprehensive, and robust. The expert should provide relevant documentation for additional methodologies. Reasons for not including additional methodologies should be clearly stated, comprehensive, and robust.

Task 4 – Reasons for the selection or rejection of a methodology by the preliminary screening should be clearly stated and consistently applied to all methodologies. Reasons also should clearly demonstrate how selected methodologies best meet scoring criteria.

Task 5 – Reasons for the selection or rejection of a methodology by the detailed examination should be clearly stated and consistently applied to all methodologies. Reasons also should clearly demonstrate how the selected methodology best meets scoring criteria.

Task 6 – The plan should clearly describe reasonable and practical steps the District can take to implement and use the selected methodology. Reasonable steps are defined as tasks for which the District has sufficient resources to accomplish. Practical steps are defined as tasks that enable the District to efficiently (from a resource perspective) implement and use a methodology to assess the effects of land use changes on phosphorus loads leaving a land parcel in the Lake Okeechobee watershed. Practical steps also should enable other interested parties (e.g. applicants for land use changes and/or their consultants) to effectively use a methodology.

Summary of Time Line and Responsibilities

Task/Deliverable, Action	Responsible Party	Due Date
Execute purchase order	District, EMA ¹ Staff	
Task 1: Deliver District materials to expert	District, PM ²	Within one day of purchase order execution
Task 1, deliverable 1: Acknowledge receipt of District materials	Expert	Within one day of receiving District materials
Task 1, Deliverable 2: Acknowledge review of District materials is complete and submit any relevant questions	Expert	Within five days of receiving District materials
Task 1: Answer any relevant questions posed by expert	District, PM ²	Within two days of receiving questions
Task 2, Deliverable 1: Memorandum containing categories and scoring system for preliminary methodology screening and detailed methodology examination	Expert	14 days (two weeks) after execution of purchase order
Task 2: Follow-up telephone call	District, PM ²	Within two days of receiving task deliverable 1
Task 2: Email summary of telephone call	District, PM ²	Within one day of telephone call
Task 2, Deliverable 2 (if needed): follow-up memorandum to Task 2 deliverable 1	Expert	Within two days of telephone call
Task 3, Deliverable 1: Memorandum containing list of methodologies to be reviewed	Expert	28 days (four weeks) after execution of purchase order
Task 3: Follow-up telephone call	District, PM ²	Within two days of receiving task deliverable 1
Task 3: Email summary of telephone call	District, PM ²	Within one day of telephone call
Task 3, Deliverable 2 (if needed): Revision of Task 3 deliverable 1	Expert	Within two days of telephone call
Task 4, Deliverable 1: Memorandum reporting results from preliminary screening of methodologies	Expert	56 days (eight weeks) after execution of purchase order
Task 4: Follow-up telephone call	District, PM ²	Within two days of receiving task deliverable 1
Task 4: Email summary of telephone call	District, PM ²	Within one day of telephone call
Task 4, Deliverable 2 (if needed): Revision of Task 4 deliverable 1	Expert	Within four days of telephone call
Task 5, Deliverable 1: Memorandum reporting results of detailed examination	Expert	98 days (14 weeks) after execution of purchase order

Task/Deliverable, Action	Responsible Party	Due Date
Task 5: Follow-up telephone call	District, PM ²	Within two days of receiving task deliverable 1
Task 5: Email summary of telephone call	District, PM ²	Within one day of telephone call
Task 5, Deliverable 2 (if needed): Revision of Task 5 deliverable 1	Expert	Within four days of telephone call
Task 6, Deliverable 1: Memorandum presenting plan for selected methodology implementation and use	Expert	105 days (15 weeks) after execution of purchase order
Task 6: Follow-up telephone call	District, PM ²	Within two days of receiving task deliverable 1
Task 6: Email summary of telephone call	District, PM ²	Within one day of telephone call
Task 6, Deliverable 2 (if needed): Revision of Task 6 deliverable 1	Expert	Within four days of telephone call

¹Environmental Monitoring & Assessment Division

²Project Manager or designee

References

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- Heatwole, C.D. (1986). "Field and basin scale water quality models for evaluating agricultural nonpoint pollution abatement programs in a south Florida flatwoods watershed." Ph.D. Dissertation. University of Florida. Gainesville, FL.
- Heatwole, C.D., Campbell, K.L., and Bottcher, A.B. (1987). "Modified CREAMS hydrology model for coastal plain flatwoods." *Transactions of the ASAE*. 30(4): 1014-1022.
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- SFWMD (1997). "Surface water improvement and management (SWIM) plan – update for Lake Okeechobee." Vol. 1. South Florida Water Management District. West Palm Beach, FL.
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- Tremwel, T.K. and Campbell, K.L. (1992) "FHANTM, a modified DRAINMOD : Sensitivity and verification results." ASAE Paper No. 92-2045. St. Joseph, MI.
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